

THOUGHTS
ON
VACCINATION,
AND
THE CAUSE OF ITS FAILING TO AFFORD
THE SAME
PROTECTION AGAINST VARIOLA,
AS FORMERLY.
BY
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“ Particular matters of fact are the undoubted foundations on which our civil and natural knowledge is built ; the benefit the understanding makes of them, is to draw from them conclusions which may be as standing rules of knowledge, and consequently of practice.”

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TO
JOHN ALLEN, Esq.

SURGEON OF HIS MAJESTY'S NAVAL HOSPITAL, MALTA,

THIS ESSAY
IS RESPECTFULLY INSCRIBED,
AS A SMALL TRIBUTE OF GRATITUDE,
AND ESTEEM,
BY HIS OBLIGED FRIEND,
THE AUTHOR.



PREFACE.

From the modified Small Pox having appeared in a considerable number of the vaccinated in this town and neighbourhood, within these few months, I have been led to consider the causes to which imperfect protection after vaccination has been attributed; and, in doing this, it occurred to me, that were it owing to any of those which have yet been assigned, we should, from the attention which has been paid to the obviating of them, find the protection derived from vaccination more perfect than it was in the early period of the practice; particularly as the supposition of its conferring a temporary immunity, only, is negatived by facts, which are daily coming under our observation.

Satisfied, therefore, that some circumstance of which we were either ignorant, or to which we paid no attention, must be the efficient cause of the Cow Pox failing to afford the same security as formerly, I was stimulated to investigate the subject with care; the result of which investigation is submitted in the annexed Essay. I by no means, however, presume to think that the conclusion at which I have there arrived, is so well established, but that its accuracy may be justly challenged, though I am not acquainted with any facts which are in the slightest degree opposed to it; I have, however, furnished the data from which it is deduced; the value of my arguments, there-

fore, will be readily estimated, and the legitimacy of my inferences easily determined. Aware, indeed, of the many sources of mistake in medical reasoning, and sensible also, but disclaiming all wish to enter the lists of controversy, that in the collision of sentiment, when conducted with candour and a due regard to the interests of science, error is corrected, and truth often elicited, I offer the following observations to the consideration of my professional brethren, in the hope, that if they should be even proved to be altogether erroneous, they may, by exciting a more fortunate or judicious inquiry, indirectly tend to the deciding of a point of practice in medicine, than which I know not one at present of more interest, or greater importance.

Dumfries, July 28th, 1825.

ON VACCINATION.

THE degree of security afforded by Vaccination against variolous infection having again become a subject of discussion with some, I beg to call your attention to a circumstance connected with it,¹ which appears to me to be of deep importance, and which seems to be overlooked, though I am persuaded that the neglect of it is tending to lessen the specific effect of the Vaccine Virus on the human system, and will, unless remedied, render

¹ The substance of this paper was read at a meeting of the Medical Society of Dumfries, May 2d, 1825. I have here adhered nearly to the form in which it was there presented, as it admits of my opinions being stated with as much conciseness as is consistent with perspicuity.

it, in time, totally useless as a safeguard against the Small Pox.

In order to unfold this opinion, as well as the evidence on which it is founded, I shall very briefly advert to the origin and progress of Vaccination, and also to some facts relative to the effect of morbid poisons on different animals.

About half a century ago, the public attention in some of the principal dairy counties in England was drawn to a vesiculopustular eruption which appeared at times on the udders and teats of the cows, and was occasionally communicated to the hands of those employed in milking them, from its being observed that the persons, to whom the disease had been thus conveyed, ever after enjoyed a perfect immunity from the Small Pox ; so fully, indeed, did that portion of the inhabitants of these districts,

under whose observation this circumstance occurred, rely on the security so obtained, that they derided the attempt to convey Variola to such as had had the Cow Pox (so this eruption was termed by them).

Little regard, however, seems to have been paid to this popular belief by the medical practitioners on the spot, until Dr. Jenner, having ascertained the truth of it by repeated experiments, announced the fact to the world in the year 1798.— Though it was at this period that his work on Vaccination issued from the press, yet, so far back as the year 1772, he proposed to Mr John Hunter to substitute it for variolous inoculation, in consequence of the reports respecting the prophylactic power of the Cow Pox having been corroborated by what had come un-

der his own observation whilst pursuing his professional duties at Sodbury, in Gloucestershire ; but as he had not verified his opinions of this by experiments, that accomplished and philosophic surgeon advised him to prosecute his researches on the subject, as there was not then sufficient evidence on which to form a judgment regarding it. This advice happily coinciding with his own inclinations, the result has been a discovery which has enrolled the name of Jenner in the list of the benefactors of his species.

It is unnecessary to notice here the controversies to which Dr. Jenner's publication gave rise.² Suffice it to observe,

² Dr Jenner's inestimable discovery, when first made public, met with much galling opposition from a few practitioners of medicine in London—an opposition not in reality founded on any laudable motive, but proceeding from sordid and ignoble

that the trials which were made by the profession, to communicate Variola to those whom they had vaccinated, completely failed. The Cow Pox having thus undergone the *experimentum crucis*, and been

feelings. This was so evident to those capable of judging of the arguments which they employed, that their disgraceful hostility would have been met with the contempt which it merited, had they not addressed themselves to the ignorance and credulity of the multitude. It became, therefore, an imperative duty of Dr J., particularly as it was attempted by some to deprive him of the credit of being the discoverer of *Vaccination*, whilst others depreciated and ridiculed the discovery itself, to expose their effrontery and absurdities, which he did in a manner highly honourable to himself, and perfectly satisfactory to the medical public; and it is but justice to add, that the greater portion of the profession, satisfied with the proofs which he adduced, and the incalculable benefits that were likely to flow from vaccination, immediately promoted his views with zeal, and, by so doing, unhesitatingly sacrificed their interest at the shrine of humanity, for the disease which they were thus endeavouring to erase from the list of human maladies, was to them a very profitable one.

found a protection against the Small Pox, Vaccination was soon eagerly adopted by the unprejudiced and disinterested, in every country to which the vaccine lymph was conveyed. It is true that, during its early practice, failures were announced; these, however, were so few, and, in some instances, of so suspicious and doubtful a character, that they did not lessen its credit with the profession, though they very much retarded its progress with the public, notwithstanding the host of facts which were appealed to by its supporters in favour of the protection that it afforded: which protection was afterwards supposed to be greatly augmented by various precautions which had been adopted from time to time, in order to ensure and determine the perfect action of the Cow Pock virus on the system, and which they

certainly, for a while, appeared to accomplish, as several years elapsed without variola occurring in such a number of the vaccinated, as to cause the virtues of the Cow Pox to be seriously questioned.— Within these few years, however, such occurrences have been rather frequent, and have been ascribed to ignorance, or carelessness in employing spurious or decomposed virus, or to innoculating whilst some cutaneous affection existed, and during the time the system was labouring under some disorder, or to the vesicles being injured, or interrupted in their progress, or to the virus producing a local action only; and although the Small Pox which has hitherto appeared in the vaccinated has, in most instances, been of an extremely mild na-

ture,³ yet from the alarm which the failures have excited, greater attention has of late been paid to these circumstances; nevertheless, they still continue to occur so frequently, in those even who have been vaccinated by careful and experienced practitioners, that many of the friends of the Cow Pox now consider it to possess only a modifying, or rather a *restraining* power over Variola, so as to render it a comparatively mild disease.

I rejoice, however, to think that there are not yet sufficient grounds for this di-

³ Variola, however, seems to be assuming a more severe character, as well as being more frequent in the vaccinated. It appears, that 195 persons labouring under genuine small pox were received into the Small Pox and Vaccine Hospital, in London, during the last year, out of which number, *forty-five* were cases of the confluent, coherent, and distinct kinds *subsequent* to vaccination.—Dr Gregory's Report; February 3d, 1825.

minution of confidence in the preservative powers of vaccination, *provided it be employed under certain regulations.*

It was decidedly proved by innumerable experiments on the introduction of the Cow Pox, that it rendered the system unsusceptible of the action of Variola. Its opponents in this country were at that time numerous, and too much interested and attentive, to allow a single case of Small Pox after vaccination to remain unnoticed and unblazoned; yet, with all their vigilance, such occurrences were so rare as scarcely to exceed those of secondary Small Pox.

If it be observed that vaccination was not so generally employed at the period I allude to, as it afterwards was, and, consequently, that the number of failures to the number vaccinated ought to be borne in

mind, it ought also to be recollected that a number of these failures undoubtedly proceeded from causes which experience has taught us to guard against. Besides, when it is considered that the Small Pox was then often a prevalent disease, and the vaccinated in consequence much exposed to its infection, the most satisfactory proof is, I think, afforded of the security derived from vaccination, in the early period of the practice ; yet we now find this security most alarmingly lessened. By some, this is attributed to the Cow Pox, conferring only a temporary immunity from Variola ; if this supposition were correct, it is evident a somewhat determinate time would, in general, elapse before the system becomes susceptible of variolous infection, after vaccination. This however, is not observed to be the case,

modified Small Pox being met with in those who have been vaccinated a few weeks, as well as in those who have been vaccinated fifteen or more years⁴; and what is still more adverse to such a conjecture is, that by far the greatest proportion of those who have been attacked with it of late have been children, who had been vaccinated but a few years⁵; in-

⁴ Dr John Thomson observed the varioloid eruptions to occur at various intervals from a few days to fifteen years after vaccination.—Thomson on the Varioloid Epidemic.

Mr Cross states that after the first few weeks from the completion of the vaccine disease, the modified variolous eruptions may appear at any subsequent time, and that they prove less mild in those above three or four years of age, than in those who are younger.—Cross on the Variolous Epidemic, p. 198.

⁵ Dr Gibson reports to Dr J. Thomson, that out of 251 cases of small pox after vaccination, which came under his observation, by far the greatest number of those attacked had been vaccinated less than two years.—Thomson on the Varioloid Epidemic.

In the town in which I write, the modified small pox has been rather prevalent in the vaccinated for some months past, and has appeared chiefly in those under ten years of age.—*Author*.

deed, the number of adults in whom that disease has appeared, who have had the Cow Pox in infancy, and, of course, soon after it was first employed as a preventive of small pox, is so very small as to render it probable that, in most instances, it has been owing to the process of vaccination in them having been interrupted by causes with which we were not at first acquainted. Some, I am aware, will consider this reasoning inconclusive, from the known fact that the progress of life renders the system, in a certain degree, unsusceptible of varicellous infection, and, to this circumstance alone, they will possibly be inclined to ascribe the difference of protection which is observed to obtain between those who have been vaccinated lately, and are still children, and those who have been vaccinated many years ago, and are now in the

prime of life, though they may be unable to explain why almost every one of the children, who were vaccinated during the early years of the practice, passed the supposed period of ordeal without having variola, whilst a considerable proportion of those children, who have been vaccinated of late years, have been attacked with it. Further, what renders such an assumption altogether untenable is, that a very small number of grown-up persons, who have been vaccinated in childhood, and happen to be now exposed to the small pox infection, are affected by it, whilst few of the *unprotected adults* so situated, escape having the disease. Admitting, however, that the small pox has attacked a few adults who had been perfectly vaccinated when very young, it does not invalidate our arguments, for variolous inoculation

itself, does not invariably confer perfect protection on every individual. The questions for our consideration are, does vaccination afford a less degree of protection against variola than formerly?—and if so, to what cause is this to be attributed? Mr Cross, who advocates vaccination with the warmth and sincerity of genuine benevolence, says, in his work on the Variolous Epidemic, which appeared in Norwich in the year 1819, that from the observations which he was able to make, he believes, “that not more than one in twenty persons, who have been vaccinated, will be affected by the most intimate exposure to small pox in the same room, and that less than *one in fifty* will have the disease answering to the generally received description of modified Small Pox.” (p. 198.) Others again have ob-

served during the prevalence of different Variolous Epidemics in various quarters, from one in two hundred to one in fifty of the vaccinated having modified Small Pox. (Monro, on the Small Pox.) Similar accounts of the occurrence of Small Pox, subsequent to vaccination, have likewise been received from the Continent within these few years, though the proportion of the vaccinated attacked with it is not stated. Pougens, however, says, that he observed in Milhau, a town containing 8000 inhabitants, more than two hundred of the vaccinated having modified Small Pox, whilst Variola prevailed there in the year 1817.—(Cross, p. 177.) On the other hand, referring to the Reports from different highly respectable sources soon after the introduction of vaccination, we learn, that, of nearly 12,000

persons who had been vaccinated at the Small Pox Hospital in London up to the year 1803, 2,500 of them had been afterwards inoculated with small pox matter, while they were, at the same time, exposed in an Hospital full of its infection, without the disease being communicated to any one of them. (Report of the Small Pox Hospital in London, Dec. 1802.) However satisfactory this statement is of the security conferred by vaccination during the period it embraces, I consider the proofs contained in the Reports to the Royal College of Physicians of London, in the year 1807, more conclusive on the subject, inasmuch as they are derived from five additional years experience of its powers; which experience appears to have confirmed the high expectations that had been formed of them. I therefore

quote with much pleasure from these Reports, as given by Mr Moore, in his History and Progress of Vaccination, marking in italics such passages as particularly bear on the point under consideration. The Royal College of Surgeons of London state, "that from accounts which they had received of 164,381 persons who had been vaccinated, it appeared that, in *fifty-six* of these, small pox had afterwards occurred, and in sixty-six, eruptions of the skin had followed." The Royal College of Physicians of Edinburgh declared, that "the evidence in favour of it (vaccination) appeared to them so strong and decisive, that in May last they spontaneously and unanimously had elected Dr Jenner an honorary Fellow of their College; and this was done with a view to publish their opinion with regard to vaccination, and

in testimony of their conviction of the immense benefits which have been, and which would in future be, derived to the world from it." The declaration of the Royal College of Surgeons of Edinburgh stated, "*that as far as their experience went, they had no doubt of the permanent security against the small pox, which is produced by the constitutional affection of the vaccine, and also that they had met with no occurrence which operated in their minds to its disadvantage.*" The King and Queen's College of Physicians at Dublin reported, "that the general introduction of vaccination into Dublin, and throughout Ireland, was in the year 1804; that the practice had been found safe, *and fully to answer all the purposes that had been intended.* Some cases had been reported to them of persons suffering from

small pox, who had been vaccinated ; but, upon minute investigation, it had been found that these supposed failures originated generally in error, in misrepresentation, or in the difficulty of discriminating between small pox and other eruptions ; and that *no case had come to their knowledge, duly authenticated by respectable and competent judges, of genuine small pox succeeding the vaccine disease.*" The Royal College of Surgeons of Ireland confirmed the above, and stated, " that the few cases of small pox which had occurred in that country, after supposed vaccination, had been satisfactorily proved to have arisen from accidental circumstances, and could not be attributed to the want of efficacy in the genuine vaccine infection, as a preventive of small pox." From these documents and all others

which could be collected, the London College of Physicians framed one comprehensive Report which was laid before the House of Commons in April 1807. They state in it that “*the security derived from vaccination against the Small Pox, if not absolutely perfect, is as nearly so, as can perhaps be expected from any human invention*, for amongst several hundred thousand cases, with the results of which the College have been made acquainted, the number of alleged failures has been surprisingly small; so much so, as to form, certainly, no reasonable objection to the general adoption of vaccination. Indeed it appears that there are not nearly so many failures in a given number of vaccinated persons, as there are deaths in an equal number of persons inoculated for the small pox (about one in

three hundred of these is said by them to perish); and it is a most important fact that in almost every case where small pox has succeeded vaccination, it has neither been the same in violence nor in duration; but has, with very few exceptions, been remarkably mild, as if the small pox had been deprived by the vaccine of all its usual malignity." This Report is evidently drawn up with much, and probably praise worthy caution, as it certainly contains no opinions in favour of vaccination, which are not fully warranted by the documents from which it is digested. Comparing it, however, and those on which it is founded, with the statements immediately preceding them of the recent occurrence of variola in the vaccinated, the difference of protection obtained from vaccination for a series of years after its introduction from that

which it now confers, is too obvious to require a single comment. But none of the causes which have yet been assigned, appear to me to account for its thus failing to afford the same degree of security at present, as it did when it was first employed ; so far indeed from their accounting for the failures which have occurred, we find that these have multiplied of late years, notwithstanding the judicious measures which have been adopted to obviate their supposed causes, which is a sufficient proof that we are still ignorant of a *something* in vaccination, which is essential to its conferring its former, and what may be deemed almost perfect protection. Neither do we receive any light on this subject, by adverting to what has occurred in the contagious Exanthemata, for we perceive that Variola, Rubeola, and Scarla-

tina, the most ancient of these of which we have any written knowledge, exhibit occasionally at present precisely the same characters, and *always yield the same protection*, which they did a thousand years ago ; and it is to be observed, that the first of these diseases has, for more than a century past, been partly propagated in this country by inoculation, and for ages in other parts of the world, without the security so derived from it having been once doubted.

From a consideration then of the whole of the before-mentioned circumstances, and reflecting, also, that the vaccine virus did not originate in man, I am led to believe, that it has undergone some change in passing through the human system. We know that some of the morbid poisons, which affect the lower animals,

exert no specific influence on the human body: others, again, which spread destruction amongst mankind are observed to be innoxious to the brute creation,⁶ and though a morbid poison may appear in one species of the latter, which seems capable of being transmitted to man, yet, with the foregoing facts before me of the different susceptibilities to morbid action between his system, and that of the other animals, I conceive it to be in the highest degree improbable, however the morbid poison may be affected at first, that it should pass an indefinite number of times through a system, whose *general* impressibility and actions differ from that in which it was generated, without at length undergoing such a change of quality, as

⁶ See Blumenbach's list of the diseases peculiar to man.

will deprive it of its original powers ; and it is matter of surprise to me, that this should never have occurred to those who have observed that the Cow Pox appears to be modified and rendered milder by passing through a succession of subjects ; though, from the committing of this imputed oversight, I ought, perhaps, to except the profession in the kingdom of Wirtemberg, where, by laws enacted in the year 1818, among other matters, and without any motive, that has come to my knowledge, being stated for so doing, provision is made for obtaining fresh vaccine ichor annually from the cow. Indeed, it would appear, that this has been adopted by them more as a measure that might possibly be necessary, than from a sense of its urgent necessity ; for Mr Cross, who simply mentions the circumstance, and from whose

work on the Variolous Epidemic I learned it after I had committed my opinions on the subject to writing, states his belief, that should the Cow Pox from Vaccination, as at present employed, and where the disease goes through its entire and regular course, not afford a degree of security approaching to perfect safety, our utmost researches could only ascertain the fact, without enabling us to alter it, p. 225. Such sentiments surely would not be entertained by so enlightened and cautious a writer, had reasons which were well founded, or even at all probable, been assigned in any document to which he had had access, for thus having recourse to the cow for ichor; at least, I cannot suppose he would have published them until he had the means of determining the value of the measure which is enjoined.

If it be objected to the opinions which I have advanced, that the appearance and progress of the vaccine vesicle have undergone no marked change, and therefore afford them no support, we all know how difficult it is to distinguish some kinds of eruptions from those of others ; and much more difficult must it be, I imagine, to detect a slight change in any particular one. Laying this argument, however, aside, we have incontrovertible proof that the Cow Pox has undergone *some* change, on whatever cause it depends, from its virus not producing the same ultimate effects on the system, as evinced by its not conferring on it the same security as formerly ; which change, as there is not the slightest reason to suppose that the human constitution has undergone any alteration of late years in this country,

seems to me, from a review of the whole of the facts which have been adduced, to be owing to the vaccine virus having lost its original qualities, from having passed for a number of years though the system of man without having been renewed from its primitive source. I am aware that Dr Mason Good is of opinion, that "it has been proved that the vaccine virus loses nothing of its specific power after a long series of transmissions from individual to individual ; for cows, he says, have been inoculated with it in this state of repeated descent, and have exhibited the disease in all its natural violence."—(Study of Medicine, vol. 2d. p. 596. 1 Ed.) These experiments, however, only prove that at the time when they were made, the vaccine virus from the human subject was capable of exciting a disease in the cow,

apparently of the same nature as that from which it had been originally derived ; but the proof is defective and obviously insufficient, in my opinion, to warrant Doctor Good's deduction, for I do not conceive that the cow pock virus has even yet lost much of its specific properties ; it is possible, therefore, for it, on being subjected to the actions of the system in which first engendered, to recover its pristine qualities, although *we have no evidence* that it did so in the experiments alluded to, for no mention is made of the virus from the vesicles so produced, having been transmitted to the human body ; we, are, therefore, ignorant of the effect which it would have produced, or the security which it would have conferred on it ; the *identity*, then, of these vesicles, with the genuine cow pock vesicle,

still remains to be proved. Hence the necessity in every practical science, and more especially in that of Medicine, wherein the premises are necessarily uncertain⁷, to consider no conclusion entitled

⁷ Medical writers have been taunted with admitting the existence of effects without causes, causes without effects, different effects from the same cause, and the same effect from different causes; and it is not perhaps necessary that they should be anxious to exonerate themselves of ^{these} ~~their~~ charges, with the exception of the first of them. To those who seek an explanation of the phenomena presented by an animate body, in the laws which seem to govern inanimate matter, such admissions doubtless appear absurd; but to those, who view it as a *living* system, susceptible of a variety of impressions and actions, and constantly influenced by innumerable, and many of them unknown agents, which cause its local and general actions, and *the degree* of its several susceptibilities to be ever varying, it appears much more absurd to maintain, that an effect may not be produced by causes which elude our senses (for no one, I believe, ever imagined the existence of effects in disease, independent of causes), or that a state of the body may not at times exist, which renders the

to our unqualified assent, until it is submitted to a widely extended experience, and every fact, and every observation which bears upon it, is fully and impartially weighed; and if it be found irreconcilable, or inconsistent with these, however specious it may appear from reasoning upon one or two objects, or occurrences, it wants the bases on which

living fibre unsusceptible of certain impressions (and consequently certain causes may be applied to it, under such circumstances without any effect resulting from them), or that the same cause will always produce the same effect, or that similar effects, under different states of the system, may not proceed from different causes. These opinions are illustrated and confirmed by what occur in common continued fever.—Here the fever very often proceeds from causes which escape our notice, and of whose essence we are in *every instance* entirely ignorant; also, the *onus* of the disease is frequently observed to fall on different organs, in different individuals, producing a considerable variety in the symptoms, or visible effects; and of those who are exposed to its causes, all are not affected

only it can rest, and may be safely dismissed as erroneous. These remarks chiefly proceed from my being sensible that some confirmatory proof, which the subject I have presumed to discuss admits of, is wanting; but as it is not likely I shall ever have it in my power to supply this, indeed, in private practice it would not, perhaps, be prudent to attempt it, even did an opportunity offer, I shall merely point out the deficiency, and at the same time express a hope, as it is a question of great importance, that some of the medical gentlemen attached to the

by them, nor have we any reason to believe that the disease is originally produced by the operation of one, but of several, and variously combined causes concurring to induce a concatenation of disordered actions, which are varied according to the different general, or local susceptibilities, or states of the system of the different individuals affected with it.

*Let us to come
back to the*

Vaccine Institutions, will be led to ascertain whether the vaccine virus has undergone any change *from passing through the human system*,⁸ by innoculating an equal number of children with this virus,

⁸ Since this paper was submitted to the consideration of my medical brethren in this place, a writer in the Literary Gazette, of May 28th, 1825, has hinted the probability that the vaccine virus becomes weakened in a direct ratio as the distance it may have attained from its original source in the cow, and therefore that it will cease in time to be a preventive of small pox. It will have been observed, that this is precisely the opinion I entertain on the subject, and which I have endeavoured to show is the probable cause of vaccination affording, at present, a less degree of security than formerly. There is, however, a difference in the premises whence each of us has drawn this conclusion. He argues upon the assumption that a diminution of the activity of the virus of some contagious diseases is evident from the milder forms which these diseases now assume, compared with those which they formerly presented; consequently that there is strong reason to suppose that other contagious diseases, cow pox included, will likewise have their virus weakened and become milder from the same cause.

such as it now is, from the human subject, and with virus direct from the cow, and after the lapse of a few months, testing the whole of these with variolous matter, and carefully observing the effect of

He has not, however, mentioned the diseases which he supposes have become milder ; if he allude to Small Pox, Measles, or Scarlet Fever, we know that not one of these is commonly milder *in its attack* than it was centuries ago, and if they are now generally less severe and fatal in their progress and termination, it is, I conceive, owing to their more judicious treatment, and not to the virus which produces them being weakened ; in fact, the benign form of these and *other contagious diseases* in some persons, is often observed to occasion the most malignant form in others, and *vice versa*, proving that the mildness or severity of the symptoms is independent of the blandness or malignancy of the different poisons which occasion them, and most probably owing to constitutional or atmospherical causes ; at least, affording no grounds to justify the inference, that the virus of a contagious disease is weakened, because that disease appears in a milder form, so long as that form possesses its true specific character, as denoted by the attendant symptoms and the permanent effects which some of these diseases produce on the system.

this upon them, whether any of them are susceptible of its action; and if so, whether it is those who have been vaccinated from the human subject, or those from the cow, or if both, what proportion they bear to each other; as also the severity of the symptoms which appear in each. These experiments ought to be repeated, on different subjects, for such a number of times as may be sufficient to prevent the possibility of error in our inferences; and if it be found that the vaccine virus has undergone the change which I suppose it has, it will then become necessary to determine at what periods we ought to return to its original source for ichor, though I am of opinion, as no *novel* practice is recommended, but merely that which appears to have been found efficient, that we are already in possession of

sufficient evidence to induce us to have recourse at once to the cow for this, and to continue to apply to the same quarter for it at short intervals, in order to preserve unimpaired to the human race one of the most valuable blessings which science has ever conferred on it.

FINIS.

ERRATA, PAGE 31, LINE 8.—For specific *properties*, read specific *property*; and where the word *powers* or *qualities* occurs, and applies to the specific power of the Cow Pock Virus, alter it, and also its relative, if it have any, to the *singular* number.